

## **SR 101 Corridor Improvement Feasibility/NEPA Study**

# executive summary

*prepared for*

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# Executive Summary

## ■ Study Overview

The SR 101 Corridor Improvement Feasibility/NEPA Study was undertaken by the Indiana Department of Transportation to assess the implications of limited north-south access in the SR 101 study area and to identify feasible improvement alternatives. The study was conducted under Indiana's Streamlined EIS Procedures (July 6, 2001) in accordance with the National Environmental Policy Act (NEPA).

Indiana State Route 101 (SR 101) is a rural two-lane roadway that runs north-south in disconnected segments along the eastern border of Indiana, from Dekalb County in northern Indiana to Switzerland County in the south, approximately the entire length of the state. Because of its lack of continuity, its ability to effectively serve north-south vehicular movement in eastern Indiana is limited. This is a particular problem affecting accessibility for counties located in the southeastern part of the state, south of I-74.<sup>1</sup> These counties include Dearborn, Ohio, Switzerland, Ripley, and Jefferson.

Figure ES 1.1 shows the SR 101 corridor study area and its major roadways. Within this area, SR 101 runs for approximately 17 miles between I-74 in the north to U.S. 50 in the south. From this southern terminus, there is an approximate 25-mile gap in the roadway to a short segment of SR 101 over the Markland Dam Bridge on the Ohio River between Indiana and Kentucky. A new roadway, currently under construction in Kentucky, will provide a direct connection from the Markland Dam to I-71 which runs east-west, south of the study area.

Due to its largely rural character and low-density of development, traffic congestion, and roadway capacity, historically, have not been a significant concern in the SR 101 corridor. However, north-south travel through the area must rely on circuitous, winding two-lane roadways. The area's hilly terrain further impedes travel, creating difficult driving conditions in poor weather and slow response to emergencies. It is apparent that these conditions may be contributing to a higher than average rate of traffic accidents on local roadways and added travel delay and inconvenience,

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<sup>1</sup> North of I-74, north-south movement is facilitated by SR 1 from Angola to Lawrenceburg and I-69 from the Michigan border to Indianapolis.



particularly for commercial vehicle operations. This overall lack of accessibility and connectivity to the major metropolitan areas of Indianapolis, Cincinnati, and Louisville may also be an impediment to the region's economic growth and development.

## ■ Study Area Roadways

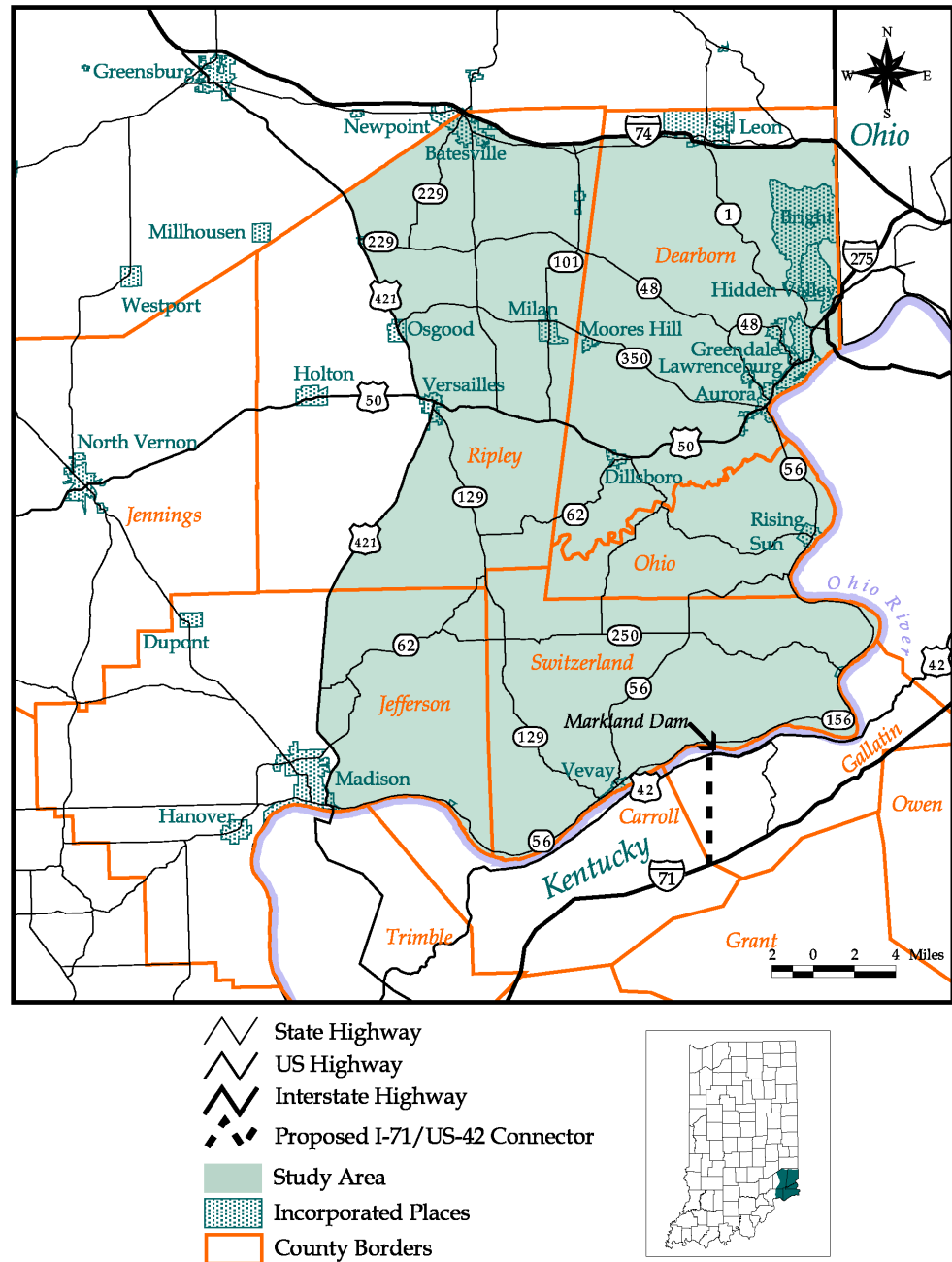
As shown in Figure ES 1.1, the study area is located in southeastern Indiana and includes all of Ohio and Switzerland Counties, all of Dearborn County south of Interstate 74, and Ripley and Jefferson Counties east of U.S. 421. Overall, about 90 percent of the roadways in the study area have two lanes. Conditions on a two-lane roadway (one lane each direction) can prevent opportunities to pass other vehicles and maintain a constant travel speed. The remaining 10 percent of area roadways have four travel lanes. These roadways include I-74 and U.S. 50 between SR 101 and Lawrenceburg. In Madison, U.S. 421 also has four lanes. A short six-lane section of U.S. 50 exists in Lawrenceburg near the I-275 connector.

Another indicator of roadway operating quality is the number of curves per mile. More than one curve per mile with severe operating speed restrictions may be cause for concern, as drivers experience a more difficult time controlling their speed and maneuvering safely on the roadway. In part, due to the particularly hilly terrain of southeastern Indiana, three routes in the study area exhibit a rate of one curve/mile or higher over an extended stretch of the route. SR 129 in Switzerland County between SR 56 in Vevay and SR 250, has over one curve per mile over a 15-mile stretch of roadway. This section of roadway was identified in the 1990 SR 101 Corridor Study for reconstruction to eliminate many of the curves, thus improving mobility along this corridor. SR 62 between Dillsboro and SR 129 has over 1.5 curves per mile over a 16-mile stretch. There are sharp curves along this section and trucks reportedly avoid using this roadway.

Analysis of 1998 daily traffic volumes on the major roadways indicates that about 90 percent of the roadway miles in the study area carry less than 10,000 vehicles per day (vpd). The highest daily volumes, greater than 25,000 vpd, are along sections of I-74 at the northern boundary of the study area and I-275 east of Lawrenceburg near the Ohio and Kentucky state borders. These sections represent two percent of the study area roadways and, because they are located at or near the study area boundaries, are not a major influence on the travel patterns within the core of the study area.



Figure ES 1.1 SR 101 Study Area



The volume-to-capacity (v/c) ratio compares the actual volume to maximum volume (capacity) that could pass a point over time. The more congested the roadway, the closer the v/c ratio is to 1.0. About 95 percent of the roadway miles within the study area are currently operating with a peak period v/c ratio of 0.60 or lower, indicating few traffic congestion issues. The roadway sections which do have a v/c greater than 0.60 are



located within more densely developed areas of Lawrenceburg, Madison, and Versailles. All roadways will experience some increase in daily traffic volumes over the next 25 years. Within the SR 101 study area, daily vehicle miles of travel (VMT) are projected to grow 28 percent between 1998 and 2025. However, about 93 percent of roadway miles will continue to experience a v/c ratio less than 0.60, indicating no emerging congestion problems. As is the case under existing conditions, some roadways in Lawrenceburg, Madison, and Versailles will continue to experience v/c rates over 0.60, indicating some localized congestion concerns.

## ■ Local Economic Conditions

The SR 101 study area is predominantly rural with only a few areas of concentrated development, including Versailles, Lawrenceburg and Aurora, and Madison. For the most part, development is sparse and recent growth in employment opportunities has been limited to jobs in the Service Sector generated by the development of gambling casinos and their adjacent hotels. The future of the region's economy has been a concern expressed by many local citizens, public officials, and business leaders. Accessibility is seen by these individuals as a key consideration in the enhancement of economic opportunities and encouragement of new development.

Corroborating the issue of economic development in Southeastern Indiana is the recent United States Department of Agriculture's annual Strategic Plan for rural development in Indiana.<sup>2</sup> The USDA identified certain rural counties in Indiana as "stressed," meaning that the area was having difficulty in being "successful and sustainable." Eleven factors were used in this evaluation, including housing-related infrastructure, population change, household income, employment, healthcare, and business growth. Out of 92 Indiana counties, Switzerland County ranked as the fourth most stressed. Of the 11 ranking factors, Switzerland County was among the top 20 highest need counties for five factors and the top 10 highest need counties for three factors, including persons living in poverty.

In recent years, the most significant change in the SR 101 study area affecting travel demand has been the development of three riverboat casinos on the Ohio River. The Indiana Riverboat Gambling Act, which became effective July 1, 1993, legalized casino gaming on riverboats. This legislation permitted the licensing of 11 riverboats, of which five were authorized for the Ohio River. Three of these Ohio River riverboat casinos are located in the SR 101 study area. Both the Argosy Casino in

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<sup>2</sup> USDA Rural Development Strategic Plan for Indiana, Revised January, 2001.



Lawrenceburg and the Grand Victoria Casino in Rising Sun opened for business in 1996. The third casino, Belterra, opened near Vevay in 2000. Each of these facilities operates from 9:00 a.m. until the late evening-early morning hours, seven days a week. Each facility includes a hotel with 200 to 300 rooms. Both the Grand Victoria and Belterra also have 18-hole golf courses. In total, these three casinos and associated hotel and resort developments employ approximately 5,000 people, equal to about 20 percent of the total employment of Switzerland, Ohio, and Dearborn counties.

Patronage at these facilities is drawn from the region at-large, encompassing the metropolitan areas of Columbus, Cincinnati, Dayton, Louisville, and Indianapolis. For each of these facilities, accessibility was cited in interviews with casino operators as a critical concern, particularly in regard to the ability of these facilities to compete with facilities located closer to major urban areas with more direct highway access.

## ■ Study Purpose and Need

An initial element of the SR 101 Corridor Improvement Feasibility Study was the development of a statement of the study's purpose and need. Definition of purpose and need was based on a technical assessment of current and future conditions within the study area as well as input from state and federal resource agencies, the SR 101 Corridor Advisory Committee, and the public-at-large. Two key transportation needs were identified for the study area which provided a basis for development and assessment of improvement alternatives:

- Improve roadway safety and reduce accident frequency; and
- Improve regional accessibility and connectivity.

### Improve Roadway Safety

An analysis of accidents throughout the five-county study area was performed using INDOT accident data from 1996 to 1998. These data were used to assess personal injury and fatality rates within the study area compared to the state of Indiana as a whole.

Table ES 1.1 summarizes injury and fatality rates on State Arterial and Collector Roadways by county. As indicated in the table, both Dearborn and Switzerland Counties had injury rates higher than the 1996 to 1998 state average, and all study area counties with the exception of Dearborn County had fatality rates equal to or higher than the state average. This



problem is particularly evident in Switzerland County which had an injury rate 36 percent higher and a fatality rate 335 percent higher than the state average.

**Table ES. 1.1 Summary of Injury and Fatality Rates on State Arterial and Collector Roadways**

County/State	Daily VMT	Injuries (1996- 1998)	Fatalities (1996- 1998)	Injury Rate*	Fatality Rate*
Dearborn	683,884	567	11	83.7	1.6
Jefferson	422,786	249	7	59.5	1.7
Ohio	94,299	62	2	66.4	2.1
Ripley	400,732	245	13	61.8	3.3
Switzerland	109,894	108	8	99.3	7.4
Indiana	73,128,283	53,022	1,197	73.2	1.7

Source: Bernardin-Lochmueller & Associates, Inc. from INDOT data.  
Note: \* Per 100 million annual vehicle miles of travel.

As traffic volumes within the study area continue to increase, accidents rates would also be expected to increase. Every accident represents a risk to human safety, as well as costs incurred by motorists and government agencies. In turn, efforts to reduce accidents represent potential benefits to motorists, communities, and government agencies in the study area and in Indiana. Of particular concern is the frequency of fatal accidents within the study area. This indicates a critical need to reduce the number and severity of accidents throughout the study area.

## Improve Regional Accessibility and Connectivity

Due to a lack of north-south roadway connections in Switzerland and Ohio counties, the issues of accessibility and connectivity to major metropolitan areas in the surrounding region have been cited as major concerns in the study area.

A major factor influencing travel patterns within the study area is the location and number of Ohio River crossings. The 60-mile stretch of the Ohio River that forms the southeastern boundary of the study area is crossed by three bridges – at Madison, Markland, and Lawrenceburg. The



Route 101 Markland Dam Bridge is about 30 miles downstream from Lawrenceburg and about 30 miles upstream from Madison.

The bridge at Madison carries about 10,000 vehicles per day (vpd), and the bridge at Markland Dam carries about 2,000 vpd. I-275, which crosses the Ohio River near Lawrenceburg, serves as a bypass route around greater Cincinnati area, and the U.S. 50/I-275 connector carries about 25,000 vpd. In Indiana, regional access to the Markland Dam Bridge is constrained because access is provided by SR 156, a two-lane rural minor arterial running along the Ohio River. Furthermore, there is no continuous north-south arterial route from the Markland Dam to U.S. 50 and onto I-74. In Kentucky, the Route 101 Markland Dam Bridge connects to U.S. 42 and is about 10.1 miles via U.S. 42 and KY 35 from I-71 in northern Kentucky. The I-71 to U.S. 42 Connector under construction in Kentucky will shorten the distance between the Markland Dam Bridge and I-71 to 7.4 miles.

The recent draft Purpose and Need Statement prepared for the I-69 Evansville-to-Indianapolis Study's Tier 1 Environmental Impact Statement<sup>3</sup> documents an analysis of personal accessibility for the entire state of Indiana. As defined in the I-69 Study's Purpose and Need Statement, "the concept of personal accessibility refers to the ease with which residents of a particular region can travel to population and employment centers and other types of attractions (e.g., health facilities, educational institutions, airports, and cultural events). Generally, a region that is well-connected internally and externally to common travel destinations will have a high degree of accessibility." Although the focus of the I-69 effort is on the southwestern portion of the state, the assessment covered the entire state and equally relevant information on accessibility was developed for southeastern Indiana and the SR 101 study area.

Detailed documentation of the analysis approach is provided in the draft I-69 Purpose and Need Statement. In summary, each traffic analysis zone (TAZ) in the model was assigned an "attractive force" (AF) rating where the higher the accessibility rating, the stronger the attraction of that TAZ as a destination for a particular type of travel – e.g., travel to urban areas, to airports, etc. The travel demand model calculates congested travel time between each TAZ and all other TAZ's in the state and then takes into account actual travel behavior in terms of an impedance factor that accounts for drivers' willingness to travel given alternative distances to destinations. This is then used to calculate an "accessibility index." The index for each TAZ is determined by calculating the ratio of attractive force to travel time between that TAZ and every other TAZ, and then

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<sup>3</sup> Bernardin, Lochmueller & Associates, Inc., I-69 Evansville-to-Indianapolis Study Tier 1 Environmental Impact Statement, Draft Purpose and Need Statement, Prepared for the Indiana Department of Transportation, April 17, 2001.



calculating the sum of those ratios. The accessibility index for a TAZ will tend to be high (or more accessible) if the TAZ has short travel times to a large number of TAZ's with high attractive force ratings or low if the TAZ is surrounded by other TAZ's with low attractive force ratings or long travel times to TAZ's with higher attractive force ratings.

Using this methodology, the I-69 study team developed accessibility index measures for various single types of attractions. The relevant findings of this analysis for the SR 101 study area can be summarized as follows:

**Accessibility to Populations Centers** – The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Parts of Switzerland County are among the least accessible areas of the state in 1998. Accessibility to these areas improves slightly in 2025.

**Accessibility to Employment** – The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Parts of Switzerland County are among the least accessible areas of the state in 1998. Accessibility to these areas improves slightly in 2025.

**Accessibility to Urban Areas** – The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Parts of Switzerland County are among the least accessible areas of the state in 1998 and remain among the least accessible areas in 2025.

**Accessibility to Major Airports** – The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Accessibility to these areas improves slightly in 2025.

**Accessibility to Institutions of Higher Education** – The SR 101 Study area is less accessible than approximately 60 percent of the state of Indiana. Switzerland and Ohio Counties are among the least accessible areas of the state in 1998 and remain among the least accessible areas in 2025.

This analysis of regional accessibility substantiates local perceptions that regional accessibility is limited for at least some travel purposes, specifically travel to urban areas and institutions of higher learning. Limited accessibility to urban areas can affect local development opportunities due to higher travel times to these areas than from other locations in Indiana. Higher travel times can result in comparatively higher transportation costs to key economic activity centers such as urban areas.



## ■ Description of Preliminary Alternatives

All “Build” alternatives were developed with two options – a southern segment providing connection from the southern portion of the study area to U.S. 50 and an optional northern segment which includes the southern segment but also provides a connection from U.S. 50 to I-74 at the northern edge of the study area. It should be noted that at the time of this study’s initiation, the study objective was to examine the feasibility of potential connections to U.S. 50 as the northern terminus of SR 101 corridor improvements. As the study has progressed, resulting in further understanding of needs of the study area, study objectives have expanded to encompass the feasibility of a corridor with a northern terminus at I-74. Therefore, each Build alternative was defined with two options – a northern terminus at U.S. 50 and a northern terminus at I-74. In order to distinguish between these options, each alternative option terminating at U.S. 50 is designated as an “A” alternative; “B” alternatives *include their complementary “A” alternative* continuing to a northern connection to I-74.

The following alternatives were initially considered:

- **Alternative 1A and 1B:** A roadway between Markland Dam (east of Vevay on SR 156) and SR 129 at U.S. 50 (east of Versailles) with possible upgrade of SR 129 to I-74;
- **Alternative 2A and 2B:** A roadway between Markland Dam (east of Vevay on SR 156) and SR 101 at U.S. 50 (east of Versailles) with possible upgrade of SR 101 to I-74;
- **Alternative 3A and 3B:** A roadway between Markland Dam (east of Vevay on SR 156) to U.S. 50 east of Dillsboro with possible extension to I-74;
- **Alternative 4:** Transportation systems management (TSM) enhancements on SR 129 between SR 250 and SR 56; on SR 56 between Vevay and SR 250; and, on SR 156 between Vevay and Rising Son; and
- **Alternative 5:** Do nothing or No Build.

Following the publication and circulation of the SR 101 Draft Preliminary Alternatives Report in October 2001, meetings were held with interested parties to obtain further input into the identification of preliminary alternatives for the SR 101 Study Area. This included meetings in November 2001 with the SR 101 Advisory Committee and the federal and state resource agencies, and a widely publicized public information meeting in Versailles. Based on input from these meetings, additional alternatives were identified for consideration.



At the meeting of resource agencies mentioned above, multiple alternatives were submitted by U.S. Environmental Protection Agency, Region 5 for consideration. To maintain a consistent means of identification, the numbering scheme used to identify the additional alternatives maintains compatibility with the numbering of alternatives submitted by U.S. EPA staff. Based on an initial staff level screening, some of these alternatives were found to be similar to other alternatives or involve corridor alignments which are significantly longer in distance than comparable alternatives. Therefore, some of these proposed alternatives were eliminated from further consideration, resulting in gaps in the numbering sequence.

The additional alternatives retained for further screening are as follow:

- **Alternative 9A and 9B:** Upgrade of SR 156 west of Vevay and SR 129 north to U.S. 421 into Versailles with possible upgrade of U.S. 421 north of Versailles to a new roadway connecting U.S. 421 with SR 229 to Batesville and I-74;
- **Alternative 11A and 11B:** A roadway between Markland Dam to SR 56/SR 250 junction with upgrade of SR 56 to Aurora; possible extension involving upgrade of SR 148 and new roadway to SR 1, connecting to I-74 in Saint Leon; and
- **Alternative 16A and 16B:** Upgrade of SR 129 from Vevay to new roadway connecting SR 129 south of Versailles to SR 129 at U.S. 50 east of Versailles; possible upgrade of SR 129 north of U.S. 50 to I-74.

Table ES 1.2 provides a summary of the ranking of each alternative according to preliminary screening criteria of safety, accessibility, new roadway construction, and impacts to 4(f) properties.<sup>4</sup>

Some further observations:

- The TSM alternative may address the identified goal of improved travel safety but it does not address the goal of improved regional accessibility and connectivity. TSM enhancements could potentially be incorporated as spot improvements into other Build alternatives which

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<sup>4</sup> Section 4(f) of the Department of Transportation Act of 1966 (49 U.S.C. 303) declares that “It is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges and historic sites.” Section 4(f) applies to publicly owned lands which are managed as parks and recreation areas, wildlife or waterfowl refuges, and to all historic sites regardless of ownership.



address the goal of improved regional accessibility and connectivity to enhance overall roadway safety.

- Alternatives 9A/9B and 11A/11B provide little or no improvement in accessibility between key locations in the study area.
- It is not intuitively apparent that Alternative 9B, and 16 A/B would draw significant traffic from I-74. Traffic oriented to/from Indianapolis would have more direct southerly access via U.S. 421. Traffic oriented to/from Ohio and Cincinnati would be able to utilize either U.S. 50 to Dillsboro or SR 56 from Lawrenceburg. However, both Alternatives 9B and 16 A/B provide improved continuity to the study area's existing road network.
- Alternatives 1B and 2B follow parallel corridors, however Alternative 2B provides a more direct, shorter connection to I-74.



**Table ES 1.2 Summary Evaluation of Preliminary Alternatives**

Alternative	Description	Safety Ranking	Accessibility Ranking	Estimated Length of New Construction (miles)	Impact to 4(f) Properties
<b>No Build/TSM</b>					
4	TSM Enhancements	M	L	33.8	No
5	No Build	None	L	0.0	No
<b>Build (to U.S. 50)</b>					
1A	Roadway to SR 129/U.S. 50	M	H	23.2	Possible
2A	Roadway to SR 101/U.S. 50	M	H	21.5	No
3A	Roadway to U.S. 50 (via SR 56)	H	H	16.9	No
9A	SR 156 to SR 129/U.S. 421 (Versailles)	M	L	7.2	Possible
11A	Roadway to SR 250/SR 56 (to Aurora)	M	M	19.1	No
16A	SR 129 Connector	M	M	12.7	Possible
<b>Build (to I-74)<sup>2</sup></b>					
1B	Roadway to SR 129/U.S. 50/I-74	M	H	23.2	Possible
2B	Roadway to SR 101/U.S. 50/I-74	H	H	38.8	No
3B	Roadway to U.S. 50 (via SR 56)/I-74	H	H	35.3	No
9B	SR 156 to SR 129/U.S. 421/SR 229 (Batesville)/I-74	M	L	22.1	Possible
11B	Roadway to SR 250/SR 56/SR 148/SR 1 (St. Leon)/I-74	M	M	29.3	No
16B	SR 129 Connector/I-74	M	M	12.7	Possible

Note: L = Low; M = Medium; H = High.



## ■ Alternatives Selected for Detailed Analysis

Based on the screening in the preceding section and the evaluation discussed above, it was recommended that the SR 101 Corridor Improvement Feasibility Study adopt the following alternatives for detailed analysis:

- **No Build** – This alternative is required for conventional alternatives analysis. It provides a baseline for comparison of impacts resulting from Build alternatives.
- **Alternative 2B** – This alternative ranks high in terms of improved accessibility between key locations in the study area as well as potential safety benefits. It would result in substantial improvement to existing roadway (SR 101 north of U.S. 50) while taking advantage of an existing interchange on I-74 with direct access to the existing SR 101 corridor. This alternative is shown in Figure ES 1.2.
- **Alternative 3B** – This alternative ranks highest in terms of improved accessibility between key locations in the study area and also ranks high for potential safety benefits. It would require development of a new right-of-way north of U.S. 50, rather than adaptation of an existing right-of-way. It also would provide for a new interchange on I-74. This alternative is shown in Figure ES 1.3.
- **Alternatives 16B** – This alternatives requires the least amount of new construction either on new ROW or reconstruction of existing ROW of all alternatives providing an improved connection to I-74 at the northern edge of the study area. Although it appears to provide limited potential for improved accessibility, this alternative provides a potentially less disruptive opportunity to improve continuity while making maximum use of the existing highway network of the study area. It also provides a bypass for north-south traffic around the town center of Versailles which may benefit from improved traffic operations. This alternative is shown in Figure ES 1.4.



Figure ES 1.2 Alternative 2A and 2B – Roadway to SR 101/U.S. 50

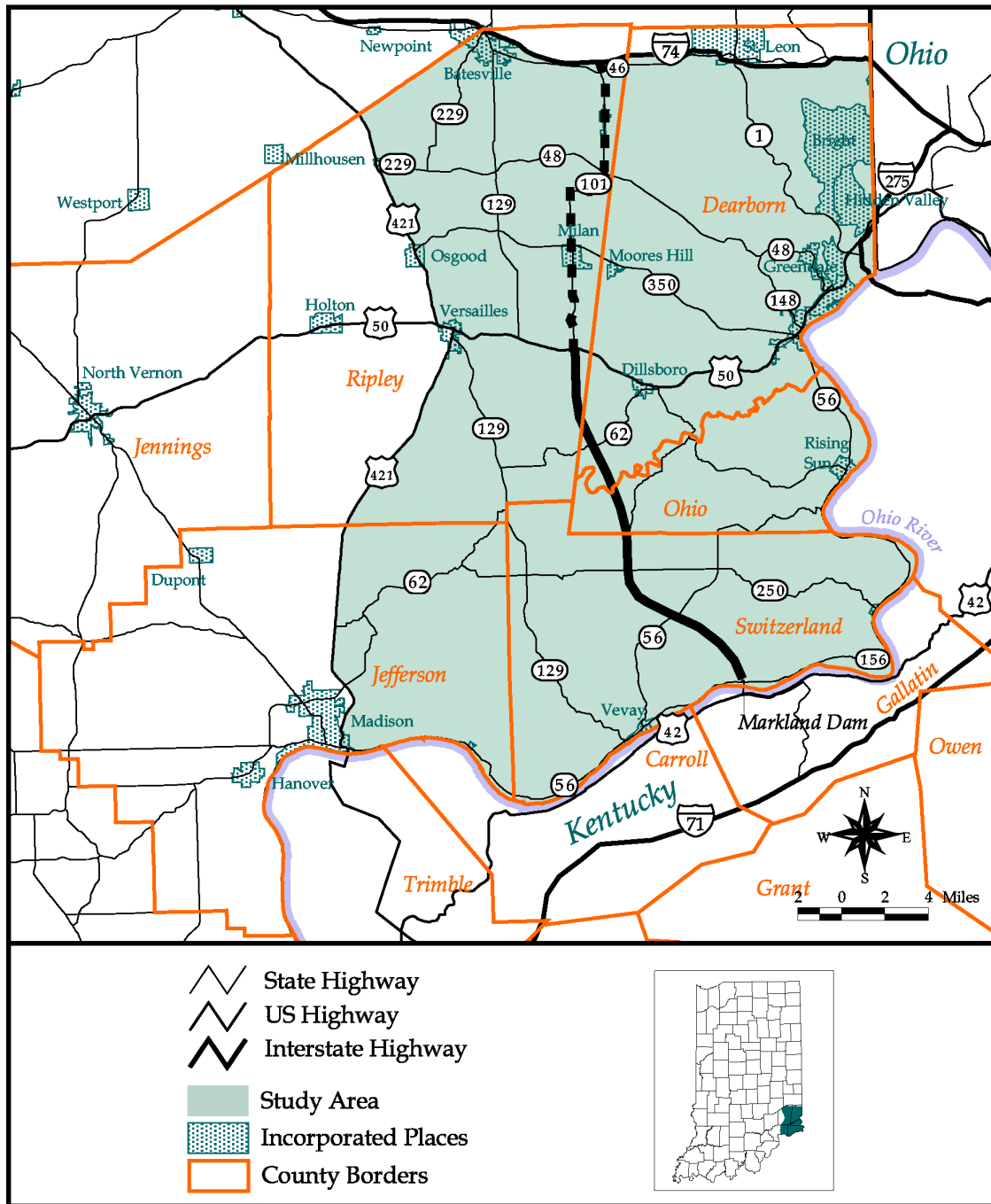




Figure ES 1.3 Alternative 3A and 3B – Roadway to U.S. 50 (via SR 56)

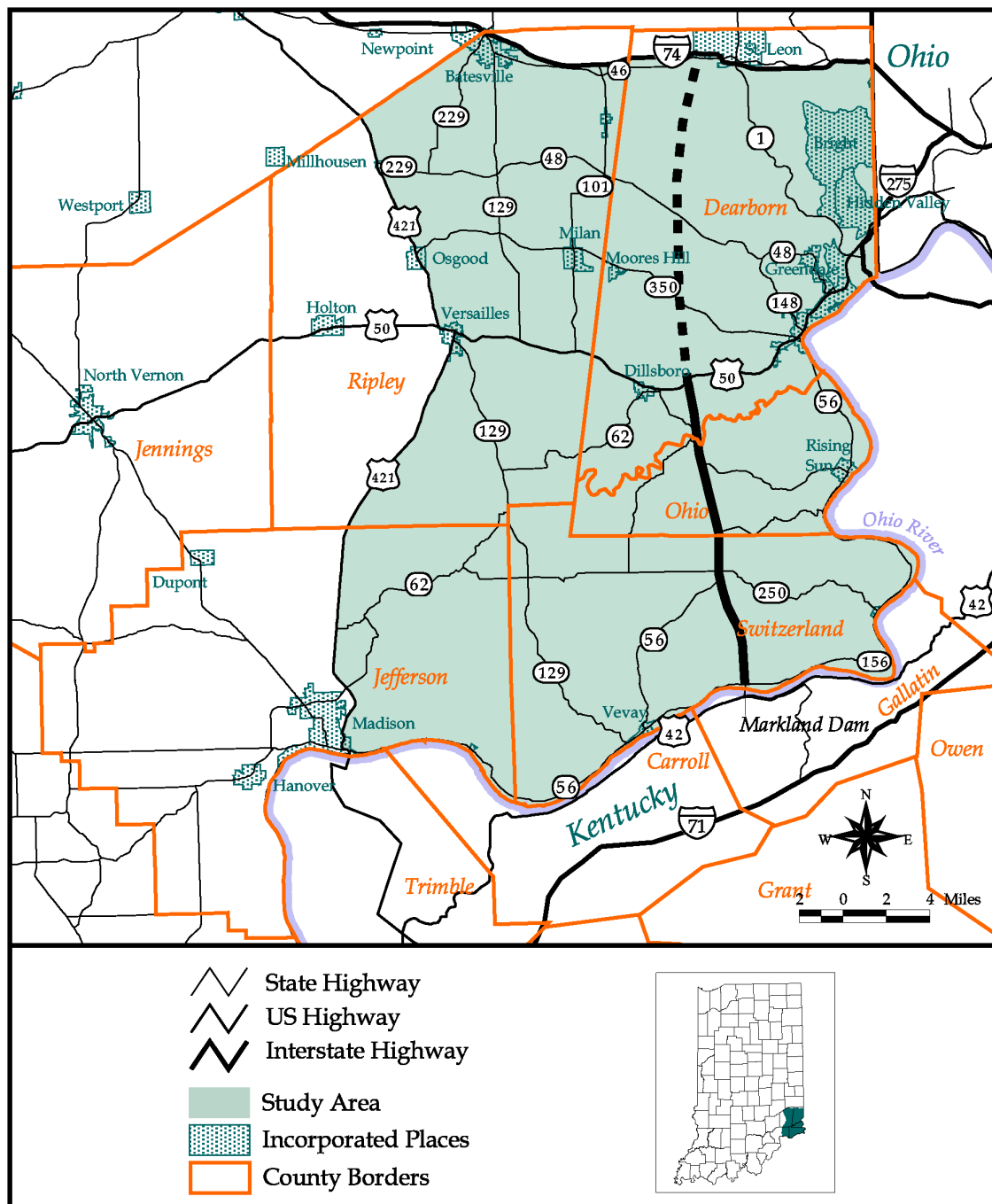
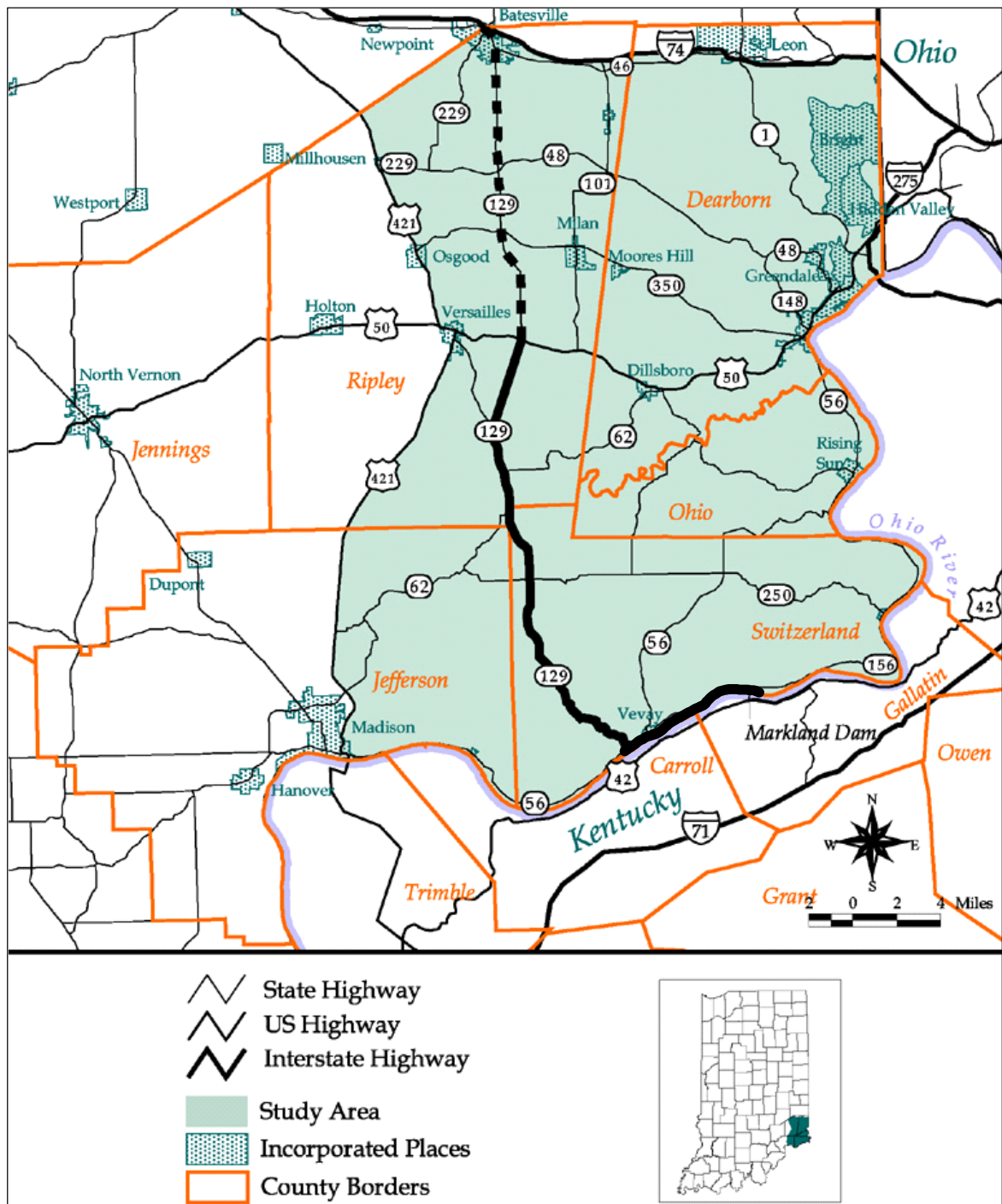




Figure ES 1.4 Alternative 16A and 16B – SR 129 Connector





## ■ Costs of Construction and Operations and Maintenance

Table ES 1.3 shows the estimated costs in 1998 dollars for construction and operation and maintenance of each of the Build alternatives. Costs were calculated based on an approximation of the roadway alignment and right-of-way. It should be emphasized that alignment and right-of-way are subject to change as a project moves forward into later stages of engineering and design.

Given the possibility that a Build alternative might be constructed in phases, costs are shown for each alternative for an “A” option representing the segment from the southern end of the study area to U.S. 50 and for a “B” option which includes both the “A” option segment south of U.S. 50 **and** the segment north of U.S. 50 to I-74. For Alternatives 2 and 3, costs are shown for both two-lane and four-lane facilities. Projections of initial traffic volumes and expectations relevant to the rate of traffic growth on the proposed roadways indicate that a two- or three-lane facility should be sufficient to serve expected demand in the near term. However, as discussed in following sections, forecasts of future traffic indicate that development of a four-lane facility along portions of the alternative alignments may eventually be warranted. Therefore consideration should be given to acquisition of right-of-way sufficient for the future expansion to a four-lane facility dependent on future traffic growth.

## ■ Summary Evaluation of Build Alternatives

Table ES 1.4 presents a summary evaluation of each of the three Build alternatives based on various criteria identified in the early stages as representative of study area needs. The Key Factors shown in the table address the transportation needs of the study area identified in the development of the study’s Purpose and Need Statement. Secondary Factors shown in the table address additional quantitative criteria which provide further information to be considered in determining which alternative or alternatives provide the greatest benefits for the SR 101 study area and the state of Indiana overall. The factors shown in **bold type** in the table indicate which alternative rated the highest or most beneficial for that particular criterion.



**Table ES 1.3 Construction and Operating/Maintenance Costs**

Alternative	Length (Miles)	Length New Construction (Miles)	Length Reconstruction (Miles)	Length No Construction (Miles)	Construction Costs Pavement (98\$)	Construction Costs Bridges (98\$)	Right-of-way Costs (98\$)	Utility Costs (98\$)	Soft Cost (Engineering, Legal, Studies) (98\$)	Total Project Capital Costs (98\$)	Annual Operating and Maintenance Cost (98\$)
<b>Cost by Alternative: Two-Lane Facilities</b>											
2A	21.5	21.5	0.0	0.0	\$48,117,000	\$2,808,000	\$2,084,848	\$4,300,000	\$8,487,502	\$65,797,350	\$617,050
2B	38.8	21.5	17.3	0.0	\$85,485,000	\$3,744,000	\$2,084,848	\$7,760,000	\$14,871,503	\$113,945,351	\$617,050
3A	16.9	16.9	0.0	0.0	\$38,181,000	\$1,528,800	\$1,638,788	\$3,380,000	\$6,618,301	\$51,346,889	\$485,030
3B	35.3	35.3	0.0	0.0	\$86,325,000	\$4,336,800	\$3,423,030	\$7,060,000	\$15,110,303	\$116,255,133	\$1,013,110
16A	33.7	5.2	7.5	21.0	\$29,109,000	\$936,000	\$560,000	\$2,540,000	\$5,007,501	\$38,152,501	\$149,240
16B	51.0	6.2	7.5	37.3	\$31,269,000	\$9,336,000	\$632,727	\$2,740,000	\$6,767,501	\$50,745,229	\$177,940
<b>Cost by Alternative: Divided Four-Lane Facilities (Alternatives 2 and 3)</b>											
2A	21.5	21.5	0.0	0.0	\$91,977,000	\$5,616,000	\$3,127,273	\$4,300,000	\$16,265,503	\$121,285,776	\$617,050
2B	38.8	21.5	17.3	0.0	\$164,637,000	\$7,488,000	\$4,804,848	\$7,760,000	\$28,687,506	\$213,377,354	\$617,050
3A	16.9	16.9	0.0	0.0	\$72,657,000	\$4,617,600	\$2,458,182	\$3,380,000	\$12,879,103	\$95,991,884	\$485,030
3B	35.3	35.3	0.0	0.0	\$158,337,000	\$10,233,600	\$5,134,545	\$7,060,000	\$28,095,106	\$208,860,251	\$1,013,110



## Key Factors

### Safety (Section 5.2.4)<sup>5</sup>

Table ES 1.4 shows a summary of predicted total accident reductions for each alternative. The table shown is a composite total all accidents reduced (fatal, injury, and property damage) for both autos and trucks as predicted by the NET\_BC model. Alternative 2B is shown to be the most effective in reducing accidents for the forecast year (2025), largely as a result of diversion of traffic to higher classification roadways with lower average accident rates per mile of travel.

**Table ES 1.4 SR 101 Summary Evaluation of Alternatives**

	Alternative 2B	Alternative 3B	Alternative 16B
<b>Key Factors</b>			
<b>Safety</b>			
Annual Accidents Reduced	<b>284</b>	169	-1
<b>Accessibility</b>			
Percent increase in population within 45 minutes	3.08%	<b>6.26%</b>	1.82%
Percent increase in population within 120 minutes	2.23%	<b>2.81%</b>	1.28%
Percent increase in jobs within 180 minutes	0.78%	<b>1.62%</b>	0.38%
Average linkage index – distance	0.78	<b>0.85</b>	0.66
Average linkage index – travel time	0.75	<b>0.83</b>	0.63
<b>Secondary Factors</b>			
<b>Mobility</b>			
Change in VMT	+34,680	<b>+20,224</b>	+73,694
Change in VHT	<b>-4,920</b>	-4,429	-3,587
<b>Environmental</b>			
Potential residential acquisitions	66	84	<b>43</b>
Wetlands impacted	34	41	<b>8</b>
Acreage acquired	940	856	<b>127</b>
<b>Economic</b>			
User benefits (in millions of dollars)	\$17.8	<b>\$37.8</b>	-\$18.3
Change in employment	301	<b>538</b>	170
Change in personal income (in millions of dollars)	\$12.1	<b>\$22.7</b>	\$7.2

<sup>5</sup> Detailed discussion of the basis for the various factors can be found in the full study report, as referenced parenthetically for each factor.



### **Accessibility (Section 5.2.4)**

Table ES 1.4 summarizes the potential accessibility benefits of each alternative based on the extent to which each alternative increases the size of population and employment within defined travel times of the study area and also the extent to which each alternative improves the efficiency of connections between key study area locations, based on distance and travel time. Alternative 3B is shown to provide the greatest benefits relative to improved accessibility. Alternative 3B is the most effective in increasing the size of population and jobs within defined travel times of the study area and also providing a more efficient connection between key locations within the study area.

## **Secondary Factors**

### **Mobility (Section 5.2.2)**

Two important indicators of how well a transportation improvement benefits mobility is the effect it has on vehicle miles of travel and vehicle hours of travel. All three Build alternatives result in diversion of traffic from lower speed but more direct roadways to the new alternative alignments. While these alignments have higher design speeds than competing routes, their use may result in a more indirect trip and longer travel distances. This occurs even though the new alternatives may provide more direct routes for travel **within** the SR 101 study area, because a majority of trips utilizing the new alignments of all three Build alternatives are through trips with no origin or destination within the study area. As indicated, all three alternatives produce some increase in statewide VMT, although Alternative 3B produces the least increase. All three alternatives produce a decrease in VHT, the largest decrease being produced by Alternative 2B.

### **Environmental (Section 5.3)**

Table ES 1.4 summarizes a number of the environmental criteria discussed in full study report. Given that Alternative 16B primarily follows the existing SR 129 right-of-way and involves a limited amount of new construction to provide greater continuity between segments of SR 129 north and south of U.S. 50, the environmental impacts of Alternative 16B are the smallest of the three alternatives. These impacts are noted in terms of potential residential property acquisitions, wetlands impacted, and acreage acquired.



## **Economic (Section 5.5)**

From an economic perspective, user benefits accounts for the value of travel time, travel cost, and travel safety. Travel time benefits are a function of reduced vehicle hours of travel which result from higher vehicle speeds and reduced travel delay. Travel cost benefits are a function of the cost of fuel, tires, lubricants, maintenance, and depreciation resulting from reduced travel time and vehicle miles of operation. Travel safety benefits result from reduced vehicle miles of operations and diversion of traffic from lower classification to higher classification facilities with lower accident rates per mile of travel. The analysis of user benefits found that Alternative 3B produced the highest user benefits of the three Build alternatives.

Benefits to users of the transportation system can produce direct benefits for businesses in the study area by reducing the cost of existing business-related trips. As intercity transportation conditions improve, highway improvements can improve access to strategic markets and make an area more attractive as a place to do business, resulting in increased sales and productivity. Improved accessibility can also enhance an area's ability to attract tourism, a particular consideration in the SR 101 study area. This combination of factors can translate into increased employment and personal income. As predicted through the application of the REMI model, Alternative 3B is the most effective alternative for increasing employment and personal income in the SR 101 study area.

## **■ Recommendations and Next Steps**

Based on the evaluation of the three Build alternatives, specifically with respect to the key evaluation factors corresponding to the identified needs of the SR 101 study area, Alternative 2B rates highest in terms of Safety and Alternative 3B rates highest in terms of Accessibility. With respect to the secondary factors, all alternatives result in increased vehicle miles of travel (VMT) and reduced vehicle hours of travel (VHT). Alternative 2B is most effective in reducing VHT. However, Alternative 3B produces the greatest benefits relevant to all Economic criteria. Alternative 16B results in the least environmental impacts relevant to the various Environmental criteria.

Despite its lowest environmental impacts, Alternative 16B produces virtually no change in the rate of accidents and little benefits relevant to improved accessibility – both primary needs of the study area. It also produces the least economic benefits for the study area. As a result, it is recommended that this alternative be removed from further consideration.



Both Alternative 2B and 3B are found to produce tangible benefits with respect to accessibility and safety although Alternative 3B provides both of these benefits plus significant economic benefits for the study area. In terms of construction costs, Alternatives 2B and 3B are approximately equivalent, although the cost of constructing only the southern segments of Alternative 3B between Markland Dam and U.S. 50 is about 25 percent less than the cost of Alternative 2B. This is particularly relevant in consideration of how the construction of a project could be phased, as discussed below. Therefore it is recommended that Alternative 3B be retained for further consideration and analysis, with particular attention directed to ways of phasing the alternatives to serve areas of greatest need and of designing the improvements to maximize their cost-effectiveness.

The design of the improvements encompassed by Alternative 3B should take the following factors into account:

- Projections of AADT traffic volumes on the new roadway indicate potential for substandard level-of-service operations if the new roadway is constructed as a two-lane facility. However, given existing traffic and development trends in the study area, it appears that construction of four-lane facility would be excessive. As also discussed, more than half of the projected traffic using the new facility is through-traffic which is diverted from alternate and, in some cases, more direct travel routes due to comparatively higher design speeds on the proposed new roadways. At least a portion of this through-traffic is likely to not make this diversion. Based on these forecasts, it appears that a design waiver should be considered by INDOT to allow construction of a two-lane facility while acquiring adequate right-of-way to allow for future widening if eventual growth in demand warrants.
- During the design stage of project development, the physical layout of the facility would be more accurately determined, addressing the need and appropriate locations of turning and climbing lanes to enhance safe operations and roadway capacity. It is anticipated that a three-lane cross-section will be needed in some portions of the new roadway.
- Analysis of truck movements in the study area indicates that a new roadway to Markland Dam, connecting with the new road between U.S. 42 and I-71 in Kentucky, would attract substantial truck traffic from alternate routes such as U.S. 421, SR 129, and SR 56. By removing trucks from alternate and potentially less safe routes, there are significant safety benefits for the study area. This also provides economic benefits as a result of reduced travel time and shipping costs for shippers and freight handlers. However, for study area residents in the vicinity of new or improved roadways or adjacent roadways which may experience increased truck volumes, there could be legitimate cause for concern if increased truck traffic leads to localized



congestion, noise, and safety issues. In designing new facilities, it will be important to assess these localized impacts, identify opportunities for mitigation including possible bypass routes where warranted, and assure affected residents that roadways will be designed to provide safe and efficient traffic operations.

## Project Phasing and Next Steps

Given the cost of constructing Alternative 3B in its entirety between Markland Dam and I-74, particularly during this period of constrained state and federal budgets, it is recommended that the project proceed in phases, initially addressing highest priority improvements and completing the project as need and financial capability may warrant. These implementation phases would consist of the following:

- **Phase 1:** Identification of specific locations of high accident frequency and/or severity in Switzerland and Ohio Counties and application of low-cost TSM-type safety improvements. Such improvements can be expedited and applied on an as-needed basis to address the highest priority locations in advance of any substantial new highway development project. Priority roadways should be SR 56 and SR 156. Improvements to SR 129 in Switzerland County are programmed for construction in 2003.
- **Phase 2:** Design and construct the southern portion of Alternative 3B between Markland Dam and U.S. 50. Travel demand forecasts of this roadway (without the extension between U.S. 50 and I-74 to the north) show AADT on this roadway in 2025 nearly equivalent to the volume which would be carried with the fully constructed roadway alternative to I-74. In the absence of the connection to I-74, traffic to the new roadway south of U.S. 50 is carried by SR 129 from the northwest and U.S. 50 from the northeast. However, added traffic on U.S. 50 in the vicinity of Lawrence, which currently experiences congested operations, may be problematic in the absence of capacity improvements in this area. Concurrent with the construction of the southern portion of the alignment, the right-of-way for the northern portion from U.S. 50 to I-74 should be delineated with efforts undertaken to preserve the right-of-way for future development.
- **Phase 3:** Completion of the northern portion of Alternative 3B from U.S. 50 to I-74.

Implementation of each phase will require appropriate programming and funding. In order to move these improvements forward, it is recommended that TSM-type safety improvements be programmed in the State Transportation Improvement Program (STIP) in the next update cycle,



with identification of approximate funding amounts and funding sources. TSM-type safety improvements can be funded in large part using federal Surface Transportation Program (STP) funds. It is also recommended that the next update of the Statewide Long-Range Transportation Plan identify the development of a new roadway between Markland Dam and U.S. 50 as a planned improvement to the regional highway system. Inclusion of the planned improvement in the Statewide Long-Range Transportation Plan is the first step in the implementation process and is a necessary step toward the programming of the project in the STIP.

An important consideration in the programming and construction of new roadway facilities is Indiana's statutory limitation on the number of highway miles which can be maintained as state highway. By law, this ceiling on state highway mileage cannot be exceeded and construction of new state highway can necessitate the relinquishment of existing state highway to county or municipal authorities. This entails a negotiated agreement between INDOT and the local authorities, taking into account the benefits provided by new facilities and potential redundancy with pre-existing roadways. Depending on final design, implementation of Alternative 3B could compel relinquishment of portions of state roadways parallel to the new alignment in the following counties:

- Switzerland County;
- Ohio County; and
- Dearborn County.

Funding of a new roadway to the extent recommended will present a challenge to INDOT, given current funding conditions and competition among numerous projects for limited resources. Identification of innovative funding sources apart from traditional state and federal funding could enhance the feasibility of project implementation. One source which should be considered are potential contributions from the casinos now operating along the Ohio River within the SR 101 study area. The Belterra Casino and Resort near Markland Dam would directly benefit through improved access from the Indianapolis and Cincinnati markets. Both the Grand Victoria in Rising Sun and the Argosy in Lawrenceburg could also benefit, although to a lesser extent. As a result, casino owners may be willing to contribute project development funds to facilitate eventual development of a new north-south roadway.